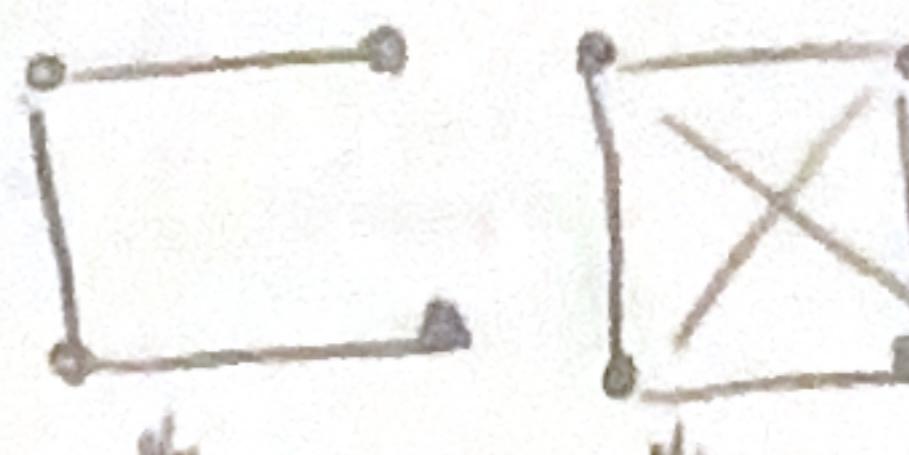


Sparse vs Dense Graphs

- If graph is sparse, adjacency list rep is linear.
- If graph is dense, it is same as adjacency matrix ($O(|V| + |E|)$)
use adj list
if graph is sparse!



$|V|^2$

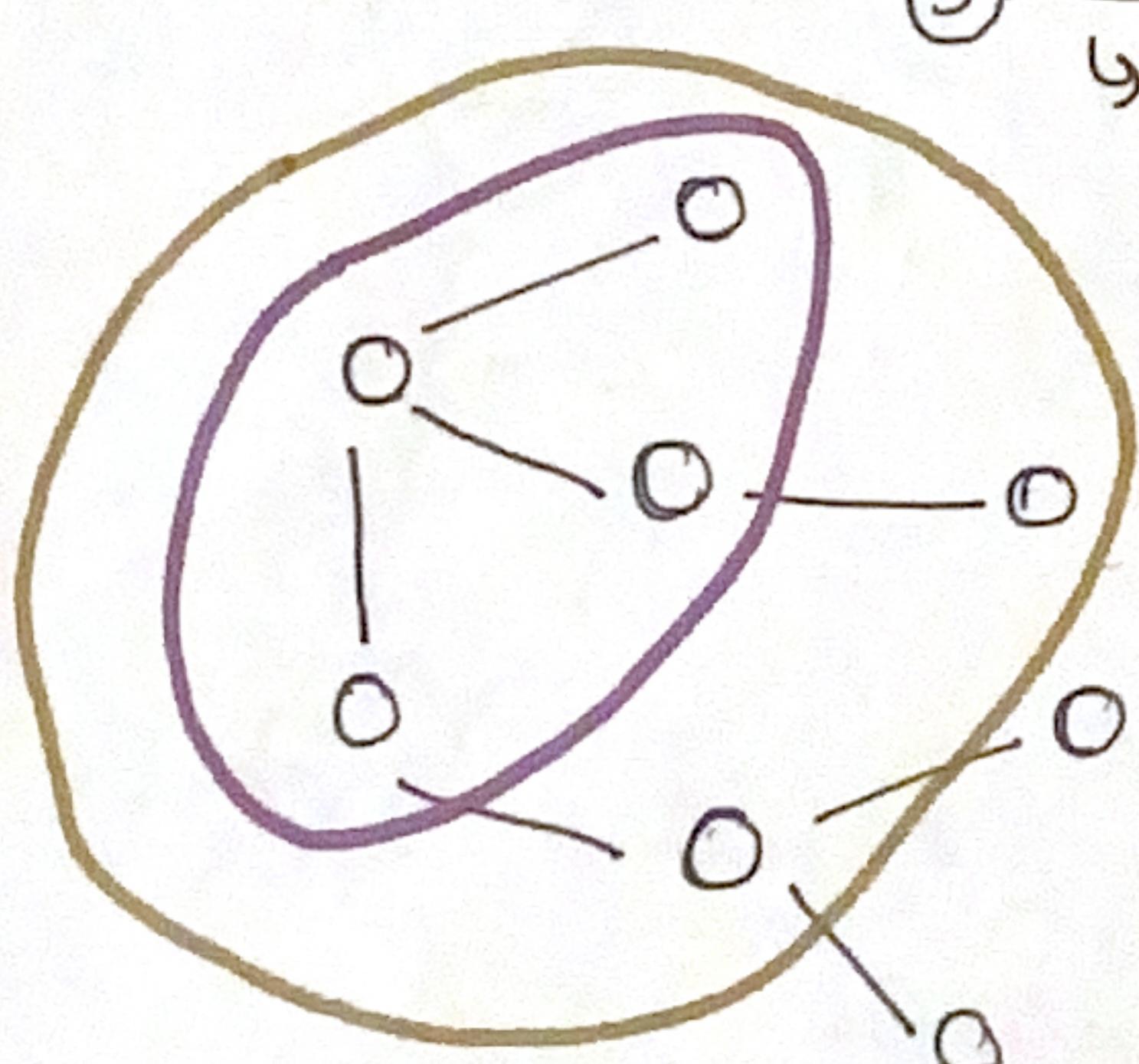
Better at checking edges

Graph Traversals

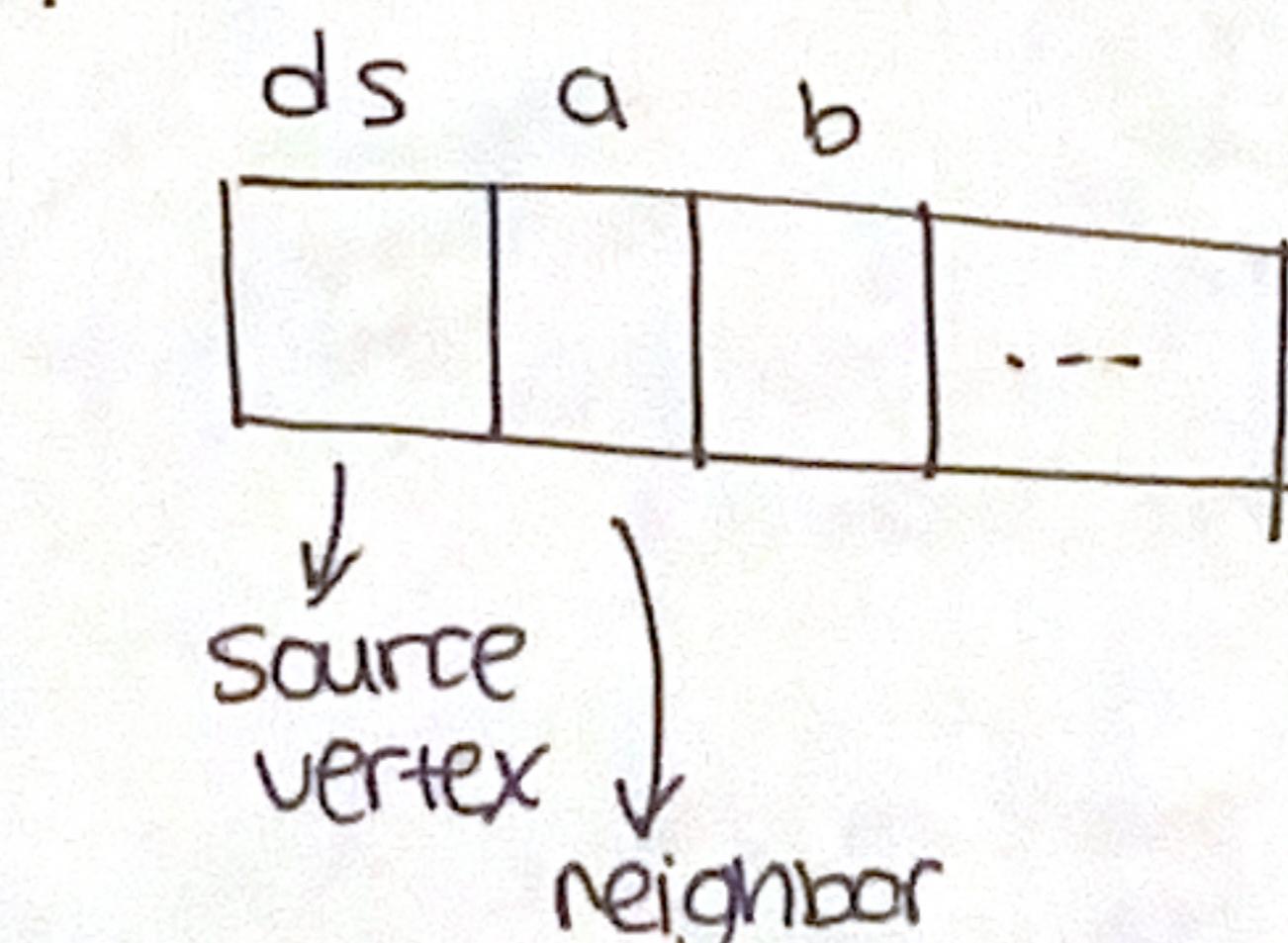
Breadth First Search

Input $\rightarrow G(V, E)$

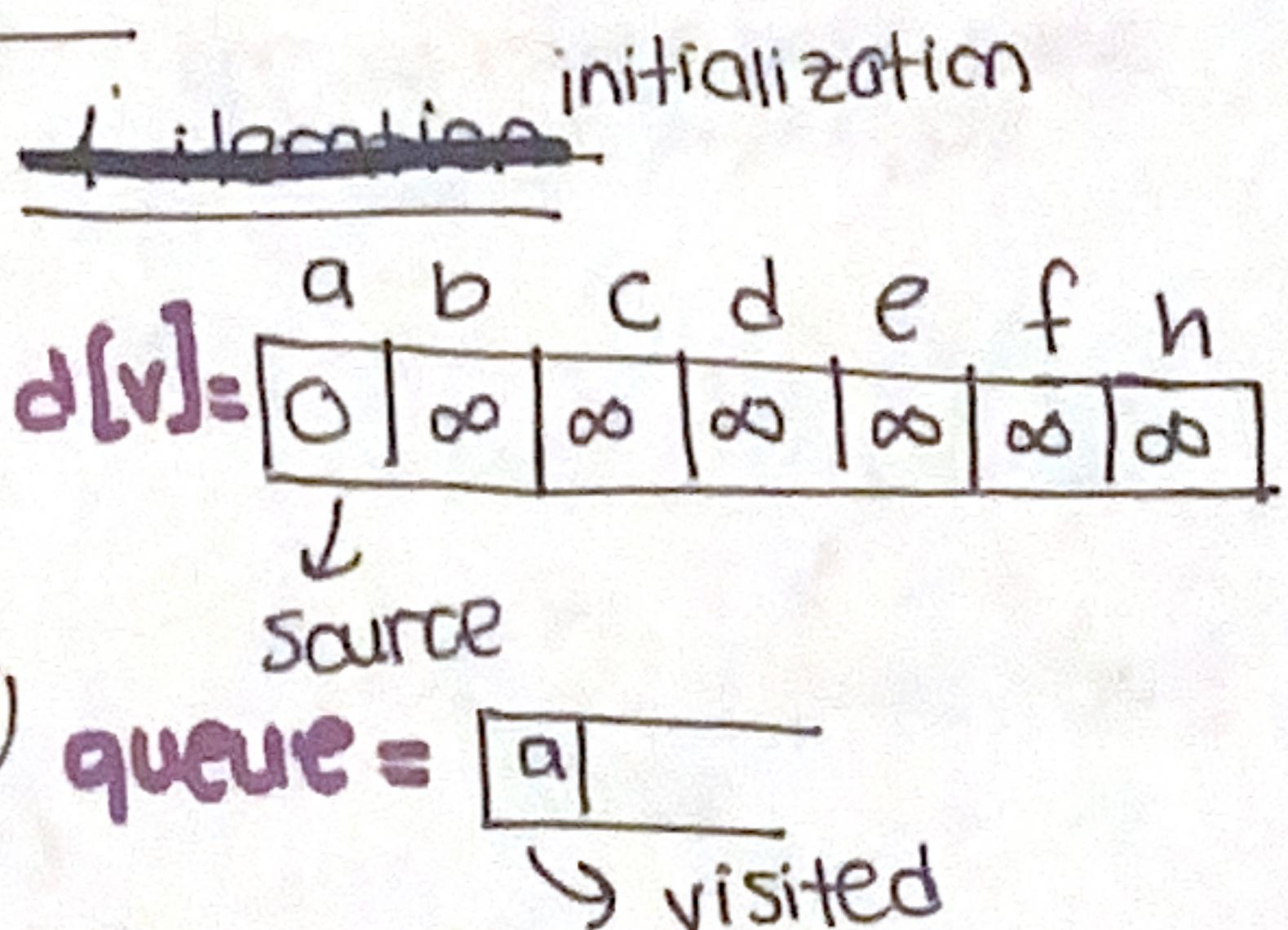
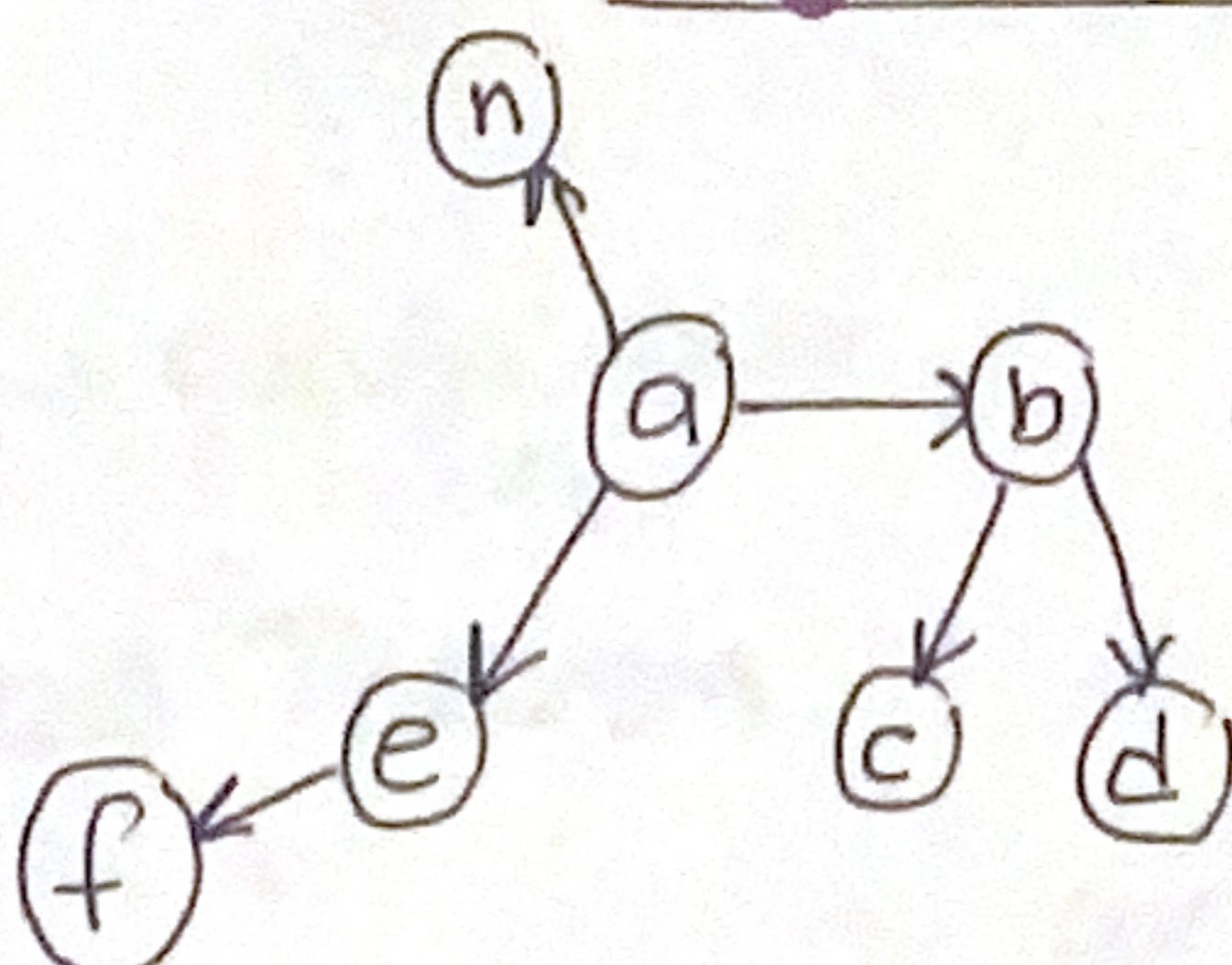
Output $\rightarrow d[v]$ distance from s to v for all vertices of V
 \rightarrow distance array



distance, how many edges are between them?



Algorithm



2. iteration

dequeue b.

check if b's neighbors = ∞

a b c d e f h

0	1	2	2	*	∞	1
		\downarrow	\downarrow	b+1	b+1	

1) iteration

check a's neighbors.

dequeue a.

add them if their distance is ∞

a b c d e f h

0	1	∞	∞	1	∞	1
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[b, e, h]

\hookrightarrow enqueued (visited)

3. iteration \rightarrow dequeue e, do the same

terminate when queue gets empty

(3)